**CEO Report #2**

**Preliminary Information**

* This report will be focusing on CEO age estimation data from a new facial recognition software (Orange) that produces eleven sets of age estimations per photo input based on different training samples.
* Unfortunately, we do not know if each training sample if based upon a niche criteria, or if the sample was simply a set of randomly selected photos.
* While the previous CEO report was made to analyze the question of whether or not CEOs age at a seemingly different physical rate than the average person (the average person aging at a rate in which they look their physical appearance), this report will be primarily focusing on determining the consistency and validity of the previous results through comparison of the Orange data.

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|  | **Average Error** | **Standard Error** | **R-Squared** |
| **Model 1** | -2.67 | 5.7143 | 0.303492 |
| **Model 2** | -3.87 | 5.35335 | 0.355379 |
| **Model 3** | -3.28 | 6.10682 | 0.254762 |
| **Model 4** | -3.94 | 5.31658 | 0.359693 |
| **Model 5** | -5.17 | 5.45806 | 0.332135 |
| **Model 6** | -4.00 | 5.44579 | 0.343409 |
| **Model 7** | -4.30 | 5.42901 | 0.346032 |
| **Model 8** | -3.32 | 5.65276 | 0.310095 |
| **Model 9** | -3.61 | 5.64439 | 0.305622 |
| **Model 10** | -3.59 | 5.41415 | 0.34541 |
| **Model 11** | -3.76 | 5.30998 | 0.361854 |
| **Average** | -3.77 | 5.46457 | 0.333158 |

**Analysis:**

* When CEO estimation error for all models was plotted against actual age, there is a clear trend in error that decreased with age. The general shared shape for all plots showed a plateau between 2 and 4 up until the early 40s, usually around 43, in which the trend line would then begin sloping downward, in which the slope would then stay fairly consistent.
  + The consistency of the negative slope was particularly interesting since we had found in previous results for both CEOs and politicians that the trend line would begin to taper and plateau again after a certain point.
* For all plotted models, we can see that the consistently highest errors in estimation were achieved between the early 40s and 50, in which had errors ranging from -5 to 10.
* For all plotted models, we can see that the consistently lowest errors in estimation were achieved between the late 60s and mid 70s, in which errors plateaued and from there on consistently ranged from -3 to -18 rather than continuing to increase negatively.
  + Both the beginning and ending ranges of the notable downward trend in error without plateaus are consistent with the ranges found within the Amazon and Microsoft results.
* However, we have found that the error ranges for the Orange data has tighter bounds compared to that of Amazon and Microsoft. Where Amazon’s early and later ranges had a breadth of 30 and 28, and Microsoft’s 20 and 27, Orange’s were 15 and 15.
* By observing when the lowest and highest bounds in error range per age would start consistently passing into the negative values and then finding the middleground, we can see on each plot that the average ‘turnover age’ in which a CEO goes from appearing older than they actually are to younger is consistently between 56 and 59.
  + This is consistent with the average turnover age we found for both Amazon and Microsoft in the previous report, being 57.
* We have observed that for all plots, CEOs begin to appear their actual age at earliest in their early 40s, and at latest in their mid 70s.
* This is consistent with the bounds we found for both Amazon and microsoft in the previous report, being 42 and 72.
* While the average error for all models was negative, with the average of all models being -3.77, this should not be taken to indicate that CEOs on average look younger than they actually are. Rather, we interpret this to mean that during a CEO’s career, the period in which they look younger than they actually are is often longer than the period in which they look older than they actually are.
* Upon observation of all plotted models, we can see that there is no ‘generic’ age estimation that the Orange software will default to as the Amazon software would.

Additionally, upon observation of the raw data for all models and seeing that the age estimation for all models is a unique result to the eighth significant digit rather than just being an integer, we can infer that the Orange software is more reliable and produces more significant results than both Amazon and Microsoft.

**Conclusions:**

* Seeing that all analyses of the Orange age estimations were consistent with the analyses of the previous report focused on Amazon and Microsoft age estimations, we can conclude that all results of the previous report are accurate and have not been affected by potential software inaccuracies. Hence, we can confidently say that the rate at which CEOs age is unique in that they seemingly age at a faster rate earlier on in life, then either remain appearing that apparent age or continue to age at a rate slower than the average person, such that in both cases, they eventually appear their actual age. This slower rate of aging is then continued after this ‘turnover age,’ such that they continuously look younger than the average person.
* This confidence in our results is particularly reinforced by the high level of significant digits used in the age estimations that the Orange software puts outs, letting us know that its outputs are unique and do not simply adhere to a ‘generic’ estimation guideline like that of Amazon.